Letter from Alexander Graham Bell to Mabel Hubbard Bell, October 1, 1896, with transcript

ALEXANDER GRAHAM BELL TO MABEL (Hubbard) BELL Beinn Bhreagh, C. B. Thursday, October 1, 1896. Dear Mabel:

Charles and Georgie and her sister Maria (?) will leave early tomorrow morning so I will send this note by them.

We have been having quite a rain storm (with high barometer and southerly winds) — and they decided not to leave today.

There has been a tremendous rain-fall last night and today. Great destruction of roads. No evidence of cyclonic action as wind has not changed materially for 24 hours — and barometer remains quite high.

Anxious to see weather chart. Cannot consider the storm as connected with the Gulf storm which has done so much damage in Washington — unroofing President Cleveland's house in Woodley Lane and etc., — because that cyclonic disturbance — passing out to sea to the south of Cape Breton would cause easterly or north easterly winds here. Cannot consider it as due to a cyclonic disturbance passing north of here — for then we would have experienced a change of wind from south to southwest, then west to northwest. The high barometer too is extraordinary as an accompaniment of such heavy rains (not under 30.2 inches at lowest point.) It is more likely that an area of high pressure has passed over the country to the south — or southwest of us — and that a trough of lower but moderately 2 high pressure on its outskirts has deluged us with rain.

Will look out anxiously for the weather charts which will interpret the whole thing.

Negative progress has been made in laboratory. We have been discovering some points that won't work! Have tried reversing the propellers upon their axis — so that they rotate in the same direction as before but with blades reversed. Realuts poor (which I expected) — but character of result not anticipated. Our feather-tester — and tobacco-pipe smoker — have shown us that the propellers we use create air currents as shown here.

I anticipated — that perhaps the reversal of the fans — without changing direction of rotation would have reversed the character of the air currents thus.

Instead of this we obtained the following curious result — as demonstrated by both feather and smoke. (By the by the feather-tester seems to be superior to smoke as a means of testing the direction of air currents.)

The currents at A are reversed in the centre. The currents at C remain as they were — and a powerful out-draught occurs as a conical ring at B — having an in-draught at its centre. This is an unexpected result — but both the smoke test — and the feather test demonstrate the reality of the effect.

Experiments show that concave wings or aero-curves — are superior to aero-planes or flat surfaces. The results 3 obtained with aeroplanes seem to be applicable generally to aero-curves. With propellers pushing horizontally — and aero-curves inclined upwards we get increasing lift as angle is increased up to 30° — and with further increase of angle a decreasing lift. Also find that propellers shoving upwards at an angle of from 50° to 60° with aero-curves at 30° to 40° give the highest lifts. Also that maximum lift is obtained by placing aero-curve below the propeller, close to it, and with the back edge of aero-curve in the same plane with back edges of propeller blades.

Superposed aero-planes or aero-curves, do not give an increased lift proportional to their surfaces. Having settled position of first wing (curve or plane). We have fixed the first set of wings in this position and have been changing the position of the second set —

to ascertain the best position for that. Having found it experimentally — we will grope in the same way for the best position for the third set and etc., etc., etc. In this way I hope to discover some general principle governing the arrangement of wings so as to be able to utilize them to the best advantage — and combine their effect. I am convinced that the direct superposition of wings one over the other — is not the most advantageous arrangement.

The laboratory note-book is not here — so that I cannot study tonight — the full bearing of the experiments made since I last reported progress. Our progress however 4 has been of the negative kind. Have learned what not to do — so that positive knowledge concerning the problem has been increased — but not in the most pleasant way.

Have had John McKillop bring some specimens of oats to the laboratory for examination. Counted the grains on five ripe stalks of cat. Found an average of about 48 grains to each stalk.

Counted grains on green oats not yet quite ripe — of the same kind as the other. Found an average of more than 82 grains to the stalk.

Thus about half of the grains of oats disappear before the grain is fully ripe — and before it is thrashed. This probably represents the destruction caused by wind blowing ripe grains off — and birds, squirrels and other animals eating them. Consider this result as multiplied into a whole crop. It means that half the crop is destroyed before it is gathered — probably still further destruction takes place during the process of cutting and stacking — loose dry grains drop off by the wholesale — and in thrashing still further loss probably occurs.

I want John McKillop to try the experiment of cutting some of his oats before the grains are fully ripe and stacking them under cover.

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If the unripe grain — like unripe fruit — will ripen after it is cut — there would be a possiblilty of fore-stalling the birds and beasts — and doubling the yield of the crop !